



Oral Health Status and Oral Health-related Quality of Life among Hospitalized and Nonhospitalized Geriatric Patients

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ABSTRACT

Introduction: The purpose of this study was to compare the oral health status and its effect on the oral health-related quality of life (OHRQoL) of hospitalized and nonhospitalized elderly patients in a single community. The null hypothesis for the study states that there is no difference in the oral health status and OHRQoL between hospitalized and nonhospitalized elderly patients.

Materials and methods: This study was conducted at the King Khalid Hospital and College of Dentistry, King Saud University, Riyadh, Kingdom of Saudi Arabia. A total of 99 (43 – hospitalized and 56 – nonhospitalized) geriatric patients participated in this study. Oral health-related quality of life was estimated using the geriatric oral health assessment index questionnaire. Decayed, missing, and filled teeth (DMFT) index and plaque index were used to assess the oral health status of the study participants.

Results: The mean age of the study participants was 68.2 years; 17.2% were females and 82.8% were males. There was no significant difference between hospitalized and nonhospitalized patients in OHRQoL and DMFT index. However, the oral hygiene status was better among nonhospitalized patients as compared with hospitalized patients.

Conclusion: There was a significant difference in the oral hygiene status between hospitalized and nonhospitalized geriatric patients.

Clinical significance: Caregivers must be sensitized to the importance of oral health for the elderly population, and oral

health should be considered an integral component of general health.

Keywords: Geriatric health service, Oral health, Quality of life, Saudi Arabia.

How to cite this article: AlBaker AM, AlBaqami FF, AlHarbi TM, AlAmri MD, Baskaradoss JK. Oral Health Status and Oral Health-related Quality of Life among Hospitalized and Nonhospitalized Geriatric Patients. *J Contemp Dent Pract* 2017;18(3):228-233.

Source of support: Nil

Conflict of interest: None

INTRODUCTION

The concept of health-related quality of life (HRQoL) can be understood as a multidimensional concept that aims to explain the psychological (emotional and mental), physical, social, and general aspects of daily living from a person's point of view. The term oral HRQoL (OHRQoL) describes the oral health-related well-being and satisfaction in regard to the former dimensions.¹ Three related and equally valuable approaches are derived from oral health-related quality of life (OHRQoL): The oral cavity as the outcome, the impacts of the oral cavity on the rest of the body, and the effects of systemic health and HRQoL on the oral cavity.² In regard to systemic health-related issues, the risk of systemic diseases increases due to poor oral health.^{3,4} Similarly, inflammation of the oral cavity may lead to cardiac, respiratory, or endocrine problems.⁵ In a longitudinal study of more than 600 individuals with periodontal disease and diabetes, the risk of death from diabetic nephropathy and ischemic heart disease is 3.2% times greater than in those without periodontal disease.⁶

In 2011, 2.5% of Saudi population are elderly (65 years or more), and by 2016, this figure is expected to reach 2.7%.⁷ Further, it is a common phenomenon in Saudi Arabia that most elderly suffer from several chronic diseases, many

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of them have physical limitations, and almost all require medications. Furthermore, at around 50 years of age, immune responses begin to decline due to immunosenescence.^{8,9} All such factors increase the risk of oral disease.^{10,11}

It is important for hospitalized patients to maintain good oral health to improve QoL.^{12,13} This is especially crucial for medically compromised or hospitalized patients because the impact on them appears to be more severe.¹⁴⁻¹⁸ Therefore, the present study was based on the following hypothesis:

Oral HRQoL in hospitalized elderly patients is impaired compared with nonhospitalized elderly patients – control group (CG).

This study aimed to:

- evaluate oral health in hospitalized elderly patients
- measure QoL in hospitalized elderly patients
- examine nonhospitalized elderly patients in the outpatient dental clinic.

Accordingly, the relationship (if any) between oral health status and QoL in hospitalized elderly patients was investigated and compared with that in nonhospitalized elderly patients.

MATERIALS AND METHODS

Inclusion Criteria

- Patients admitted to the hospital for at least 1 week
- Geriatric patients aged 65 years or older
- Cognitively intact and able to communicate patients.

Exclusion Criteria

- Geriatric patients <65 years
- Presence of communication difficulties or psychiatric diseases.

Hospitalized Patients

A total of 43 patients admitted to King Khalid University Hospital participated in this study. They were divided into four groups as follows: I (11 patients), II (11 patients), III (11 patients), and IV (10 patients). Groups I and II were examined by examiner 1 and groups III and IV were examined by examiner 2. A random sample of 20 participants were reexamined after 1 week to determine the examiner's repeatability in scoring of decayed, missing, and filled teeth (DMFT).

Nonhospitalized Patients

Fifty six nonhospitalized elderly patients were recruited from the same community and examined at King Saud University Dental Clinics in Riyadh, Kingdom of Saudi Arabia. Detailed medical history was obtained through the use of a special form.

Ethical Considerations

This study was approved by the College of Dentistry Research Center Ethics Review Board, King Saud University. Participants were requested to sign a consent form and had the right to resign from the research project at any stage of the investigation.

Clinical Dental Examination

Oral examination of hospitalized patients was undertaken at the bedside with a pen lamp, a disclosing agent, and a disposable examination tray (containing a mouth mirror, tweezers, dental explorer, and cotton rolls). The same examiners also examined nonhospitalized patients in a normally equipped dental unit at the university's dental clinics under similar conditions. DMFT index was used to examine the dental condition of the patients, and caries was diagnosed for each tooth by visual inspection where only clear cavitations were included. Oral hygiene status was registered through the use of plaque index. This was then recorded for the buccal, lingual, mesial, and distal surfaces (including crowns and roots) of all teeth.

Questionnaire

The geriatric oral health assessment index (GOHAI) was used to measure OHRQoL. This 12-item questionnaire measures an individual's perception of how oral health conditions affect certain functions. This includes the physical functions, such as trouble chewing, limited choice of food, and clarity of speaking; the psychological functions, such as worrying about teeth problems, limited social contact, embarrassment from eating with others; and pain or discomfort from oral cavity, such as sensitivity to hot/cold/sweet/sour foods, use of pain relief drugs that cannot be swallowed comfortably. The response is given on a 5-point scale. The total score range is from 12 to 60, with a higher score representing a better OHRQoL.

Statistical Analysis

Patients' data were saved into a computer file and then entered in the program Statistical Package for the Social Sciences for Windows (SPSS Version 18, Chicago, IL, USA). The participants were divided into four groups according to age: 65 to 70, 71 to 75, 76 to 80, and more than 80 and analyzed by analysis of variance test for significant difference in OHRQoL. The statistic analyses of the means and standard deviations, the difference between hospitalized and nonhospitalized patients, and the difference between gender and age groups in relation to dental data and GOHAI were performed by cross-tabulation, χ^2 test, and t-test. Pearson's correlation was used to test

the significance between DMFT and plaque index with GOHAI ($\alpha=.05$).

RESULTS

Table 1 shows demographic data of the hospitalized and nonhospitalized patients. The mean age of the study participants was 68.2 years; with 17.2% females and 82.8% males. Furthermore, 43.40% were illiterate and 56.60% were literate. Approximately 69.70% had not received health education regarding oral hygiene and 58.60% brushed their teeth only once a day (Table 2). Concerning the dental and oral conditions of the participants, 27.3% of the hospitalized patients had no prosthesis, whereas 9.10% of nonhospitalized patients had no prosthesis (Table 3). Xerostomia was present in 36.4% of the hospitalized patients and in 14.1% of the nonhospitalized patients (Table 4). All hospitalized and nonhospitalized patients reported moderate OHRQoL, with the mean total GOHAI scores of 28.95 and 28.45, respectively (Table 5). The total GOHAI score was 28.46 for the male participants and 28.76 for the females (Table 6). The results showed was no statistically significant difference in

GOHAI score between hospitalized and nonhospitalized patients ($p = 0.624$) and between males and females ($p = 0.931$). Furthermore, there was no statistically significant difference in the GOHAI score between age groups (Table 7). About 25.2% of hospitalized patients and 31.3% of nonhospitalized patients had four or more decayed teeth. The mean DMFT score was 22.26% in hospitalized patients, and 22.95% in nonhospitalized patients (Table 8), and 22.46% for males and 23.53% for females (Table 9) with no statistically significant differences between them. Regarding the number of missing teeth, 18.2% of the hospitalized patients and 23% of the nonhospitalized patients had fewer than eight pairs of occluding teeth. The mean plaque index score in hospitalized patients was 85.28%, which was significantly ($p = 0.001$) higher than that (63.36%) in nonhospitalized patients (Table 10). Furthermore, the mean plaque index score in male participants was 70.66%, which was significantly ($p = 0.001$) lower than that (83.59%) in female participants (Table 11). The correlation of the OHRQoL to the DMFT and plaque index revealed that as DMFT increases, the GOHAI score increases ($p = 0.003$). As plaque index increased, the GOHAI score decreased ($p = 0.000$; Table 12).

Table 1: Demographic data of the participants (n = 99)

Demographic data		Gender		
		Male	Female	Total
Hospitalized	Count (% of total)	31 (31.30)	12 (12.10)	43 (43.40)
Nonhospitalized	Count (% of total)	51 (51.50)	5 (5.10)	56 (56.60)
<i>General literacy level</i>				
		Illiterate	Literate	Total
Hospitalized	Count (% of total)	25 (25.30)	18 (18.20)	43 (43.40)
Nonhospitalized	Count (% of total)	18 (18.20)	38 (38.40)	56 (56.60)
<i>Do you practice any type of oral hygiene?</i>				
		Yes	No	Total
Hospitalized	Count (% of total)	32 (32.30)	11 (11.10)	43 (43.40)
Nonhospitalized	Count (% of total)	47 (47.50)	9 (9.10)	56 (56.60)
<i>Have you received health education regarding oral hygiene?</i>				
		Yes	No	Total
Hospitalized	Count (% of total)	15 (15.20)	28 (28.30)	43 (43.40)
Nonhospitalized	Count (% of total)	15 (15.20)	41 (41.40)	56 (56.60)
<i>When was the last time you visited a dentist?</i>				
		<6 months	6 months and more	Total
Hospitalized	Count (% of total)	9 (9.10)	34 (34.30)	43 (43.40)
Nonhospitalized	Count (% of total)	46 (46.50)	10 (10.10)	56 (56.60)

Table 2: Frequency of brushing

		Frequency of brushing				Total
		Never	Once	Twice	Thrice or more	
Hospitalized	Count (% of total)	13 (13.10)	20 (20.20)	10 (10.10)	0 (0.00)	43 (43.40)
Nonhospitalized	Count (% of total)	8 (8.10)	38 (38.40)	5 (5.10)	5 (5.10)	56 (56.60)
Total	Count (% of total)	21 (21.2)	58 (58.60)	15 (15.20)	5 (5.10)	99 (100.00)



Table 3: Prosthetic status

		Prosthetic type						Total
		No prosthesis	Bridge	More than one bridge	Partial denture	Both bridge(s) and partial denture(s)	Full removable denture	
Hospitalized	Count (% of total)	27 (27.30)	3 (3.00)	1 (1.00)	7 (7.10)	5 (5.10)	0 (0.00)	43 (43.40)
Nonhospitalized	Count (% of total)	9 (9.10)	14 (14.10)	12 (12.10)	6 (6.10)	0 (0.00)	15 (15.20)	56 (56.60)
Total	Count (% of total)	36 (36.40)	17 (17.20)	13 (13.10)	13 (13.10)	5 (5.10)	15 (15.20)%	99 (100.00)

Table 4: Saliva examination

		Saliva		
		Healthy	Xerostomia	Total
Hospitalized	Count (% of total)	7 (7.1)	36 (36.4)	43 (43.4)
Nonhospitalized	Count (% of total)	42 (42.4)	14 (14.1)	56 (56.6)
Total	Count (% of total)	49 (49.5)	50 (50.5)	99 (100.0)

Table 5: Geriatric oral health assessment index (GOHAI) score related to hospitalization

Hospitalization	n	Mean	Standard deviation	t-value	Sig. (two-tailed)
GOHAI Hospitalized	43	28.9535	5.80211	0.492	0.624
GOHAI Nonhospitalized	56	28.4464	4.45552		

Table 6: Geriatric oral health assessment index (GOHAI) score related to gender

Gender	n	Mean	Standard deviation	t-value	Sig. (two-tailed)
GOHAI Male	82	28.6463	5.17442	-0.087	0.931
GOHAI Female	17	28.7647	4.63046		

Table 7: Comparison of geriatric oral health assessment index (GOHAI) scores between age groups

(I) Age of the resident	(J) Age of the resident	Mean difference (I - J)	Sig.
65-70	71-75	-4.13987	0.130
	76-80	-2.58431	0.849
	More than 80	-6.41765	0.348
71-75	65-70	4.13987	0.130
	76-80	1.55556	0.973
	More than 80	-2.27778	0.950
76-80	65-70	2.58431	0.849
	71-75	-1.55556	0.973
	More than 80	-3.83333	0.865
More than 80	65-70	6.41765	0.348
	71-75	2.27778	0.950
	76-80	3.83333	0.865

Table 8: Decayed, missing, and filled teeth (DMFT) related to hospitalization

Hospitalization	n	Mean	Standard deviation	t-value	Sig. (two-tailed)
DMFT Hospitalized	43	22.26	3.423	-0.866	0.388
DMFT Nonhospitalized	56	22.95	4.279		

Table 9: Decayed, missing, and filled teeth (DMFT) related to gender

Gender	n	Mean	Standard deviation	t-value	Sig. (two-tailed)
DMFT Male	82	22.46	4.155	-1.419	0.164
DMFT Female	17	23.53	2.452		

Table 10: Plaque index related to hospitalization

	Hospitalization	n	Mean	Standard deviation	t-value	Sig. (two-tailed)
Plaque index	Hospitalized	43	85.28	10.480	6.607	0.001
	Nonhospitalized	56	63.36	21.761		

Table 11: Plaque index related to gender

	Gender	n	Mean	Standard deviation	t-value	Sig. (two-tailed)
Plaque index	Male	82	70.66	21.648	-3.561	0.001
	Female	17	83.59	11.270		

Table 12: Correlation of GOHAI with DMFT and plaque index

	GOHAI
DMFT	
Pearson's correlation	0.298(**)
Sig. (two-tailed)	0.003
n	99
Plaque index	
Pearson's correlation	-0.389(**)
Sig. (two-tailed)	0.000
n	99

*Correlation is significant at the 0.05 level (two-tailed); **Correlation is significant at the 0.01 level (two-tailed).

DISCUSSION

This study evaluated the oral health status and OHRQoL of hospitalized and nonhospitalized elderly patients. Pajukoski et al¹⁹ found that hospitalized elderly patients who had many concomitant diseases and used many drugs daily had worse dental health than nonhospitalized home-dwelling elderly patients. However, the present results showed that OHRQoL in both hospitalized and nonhospitalized elderly patients are generally the same. Therefore, the tested hypothesis was rejected. Furthermore, DMFT did not statistically significantly differ between hospitalized and nonhospitalized patients. This could be because the time of hospitalization of the patient group included in this study was short (7–21 days), which may not be enough for the DMFT to change. Matthews et al²⁰ revealed a high prevalence of untreated oral disease and DMFT in long-term care residents. However, contradictory results were reported by Schimmel et al.²¹ They examined 31 patients between 18 and 85 days after hospitalization and 24 CG patients; they found patient group and CG presented no significant difference regarding age, gender, number of teeth, or number of occlusal units. Despite that, the plaque index was significantly different in the two groups. Hospitalized patients had poor oral hygiene, whereas nonhospitalized patients showed fair oral hygiene. This may be due to different factors. Hospitalized patients ignore the oral hygiene because they have more urgent and systemic

health issues that attract their attention. Furthermore, some of them need assistance to maintain good oral hygiene. This is an indicator that the nursing staff require education on how to maintain good oral hygiene for such patients. The direct association of OHRQoL and DMFT index score was shown in this study in both hospitalized and nonhospitalized patients. It is pertinent to note that most of the participants have received removable partial dentures supported by dental implants. Placement of implants under the existing dental prostheses improves OHRQoL.²² Based on multiple comparisons of age groups, we found that age has no significant effect on OHRQoL, DMFT index, and plaque index in those patients. This study also indicated that moderate OHRQoL of geriatric patients with the physical functions of eating, trouble biting, and swallowing is rated in hospitalized patients as the poorest. Similarly, geriatric patients who have fewer than eight pairs of occluding teeth limit their choice of food, which may lead to poor nutrition as well as undermine their general health.²³ Oral health was perceived by 28% (121) of the older people as not being important to life quality. However, the vast majority, i.e., 72% (313), claimed that their oral health status was important to their QoL in one way or another.²⁴ Moreover, xerostomia may affect the OHRQoL as it hampers food chewing and swallowing. A previous study found that xerostomia not only worsened the sense of taste of food but also hindered word pronunciation.²⁵ Many medications commonly taken by older people can affect saliva production and result in oral dryness. Effective monitoring of xerostomia is an important to decrease the risk for root caries. Tooth decay and periodontal conditions are the main reasons for tooth loss in older patients.²⁶ Therefore, routine assessment of dental and periodontal conditions allows early detection and immediate treatment of oral health problems. Numerous studies have found that psychological factors, such as depression²⁷ and social support²⁸ affect the OHRQoL of the community of older people. Incorporating these factors in the analysis may provide a better explanation for moderate OHRQoL in hospitalized and nonhospitalized patients.

CONCLUSION

Within the limitations of this study, there is a significant impact of oral hygiene status on OHRQoL of the hospitalized patients, which requires education, motivation of caregivers, and routine screening for their oral health problems. Further studies are needed to identify the effects of specific systemic diseases on the OHRQoL.

REFERENCES

- Müller F, von Steinbüchel N. Lebensqualität im alter und subjektive mundgesundheit. *Quintessenz* 2005;56(12):1291-1299.
- Patrick, DL.; Erickson, P. Health status and health policy: quality of life in health care evaluation and resource allocation. New York: Oxford University Press;1993. p. 478.
- Scannapieco FA. Role of oral bacteria in respiratory infection. *J Periodontol* 1999 Jul;70(7):793-802.
- Shay K. Infectious complications of dental and periodontal diseases in the elderly population. *Clin Infect Dis* 2002 May;34(9):1215-1223.
- Gurenlian JR. Inflammation: the relationship between oral health and systemic disease. *Dent Assist* 2009 Mar-Apr;78(2): 8-10, 12-14, 38-40.
- Saremi A, Nelson RG, Tulloch-Reid M, Hanson RL, Sievers ML, Taylor GW, Shlossman M, Bennett PH, Genco R, Knowler WC. Periodontal disease and mortality in type 2 diabetes. *Diabetes Care* 2005 Jan;28(1):27-32.
- EIU Views Wire. Saudi Arabia economy: demographic profile; 2012.
- Aw D, Silva AB, Palmer DB. Immunosenescence: emerging challenges for an ageing population. *Immunology* 2007 Apr;120(4):435-446.
- Chandra RK. Nutrition and the immune system: an introduction. *Am J Clin Nutr* 1997 Aug;66(2):460S-463S.
- Guivante-Nabet C, Berenholc C, Berdal A. Caries activity and associated risk factors in elderly hospitalised population – 15-months follow-up in French institutions. *Gerodontology* 1999 Jul;16(1):47-58.
- Kossioni AE, Karkazis HC. Socio-medical condition and oral functional status in an older institutionalised population. *Gerodontology* 1999 Jul;16(1):21-28.
- Yu DS, Lee DT, Hong AW, Lau TY, Leung EM. Impact of oral health status on oral health-related quality of life in Chinese hospitalised geriatric patients. *Qual Life Res* 2008 Apr;17(3):397-405.
- Llewellyn CD, Warnakulasuriya S. The impact of stomatological disease on oral health-related quality of life. *Eur J Oral Sci* 2003 Aug;111(4):297-304.
- Locker D, Matear D, Stephens M, Jokovic A. Oral health-related quality of life of a population of medically compromised elderly people. *Community Dent Health* 2002 Jun;19(2): 90-97.
- Duke RL, Campbell BH, Indresano AT, Eaton DJ, Marbella AM, Myers KB, Layde PM. Dental status and quality of life in long-term head and neck cancer survivors. *Laryngoscope* 2005 Apr;115(4):678-683.
- Ingram SS, Seo PH, Sloane R, Francis T, Clipp EC, Doyle ME, Montana GS, Cohen HJ. The association between oral health and general health and quality of life in older male cancer patients. *J Am Geriatr Soc* 2005 Sep;53(9):1504-1509.
- McMillan AS, Leung KC, Pow EH, Wong MC, Li LS, Allen PF. Oral health-related quality of life of stroke survivors on discharge from hospital after rehabilitation. *J Oral Rehabil* 2005 Jul;32(7):495-503.
- Mulligan R, Seirawan H, Alves ME, Navazesh M, Phelan JA, Greenspan D, Greenspan JS, Mack WJ. Oral health-related quality of life among HIV-infected and at-risk women. *Community Dent Oral Epidemiol* 2008 Dec;36(6):549-557.
- Pajukoski H, Meurman JH, Snellman-Gröhn S, Sulkava R. Oral health in hospitalized and nonhospitalized community-dwelling elderly patients. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod* 1999 Oct;88(4):437-443.
- Matthews DC, Clovis JB, Brillant MG, Filiaggi MJ, McNally ME, Kotzer RD, Lawrence HP. Oral health status of long-term care residents-a vulnerable population. *J Can Dent Assoc* 2012;78:c3.
- Schimmel M, Leemann B, Christou P, Kiliaridis S, Schnider A, Herrmann FR, Müller F. Oral health-related quality of life in hospitalised stroke patients. *Gerodontology* 2011 Mar;28(1):3-11.
- Wolfart S, Moll D, Hilgers RD, Wolfart M, Kern M. Implant placement under existing removable dental prostheses and its effect on oral health-related quality of life. *Clin Oral Implants Res* 2013 Dec;24(12):1354-1359.
- Nowjack-Raymer RE, Sheiham A. Association of edentulism and diet and nutrition in US adults. *J Dent Res* 2003 Feb;82(2):123-126.
- McGrath C, Bedi R. The importance of oral health to older people's quality of life. *Gerodontology* 1999 Jul;16(1):59-63.
- Gerdin EW, Einarson S, Jonsson M, Aronsson K, Johansson I. Impact of dry mouth conditions on oral health-related quality of life in older people. *Gerodontology* 2005 Dec;22(4):219-226.
- Kwan SY, Williams SA. Dental beliefs, knowledge and behaviour of Chinese people in the United Kingdom. *Community Dent Health* 1999 Mar;16(1):33-39.
- Kressin NR, Spiro A 3rd, Atchison KA, Kazis L, Jones JA. Is depressive symptomatology associated with worse oral functioning and well-being among older adults? *J Public Health Dent* 2002 Winter;62(1):5-12.
- McGrath C, Bedi R. Influences of social support on the oral health of older people in Britain. *J Oral Rehabil* 2002 Oct;29(10):918-922.